DUAL-AXIS HINGE MECHANISM

BACKGROUND

1. Technical Field

The present disclosure generally relates to hinge mechanisms, particularly, to a dual-axis hinge mechanism typically used for an electronic device.

2. Description of Related Art

An electronic device such as a mobile phone, a notebook computer, or a personal digital assistant (PDA), generally has a main body and a display cover. In general, the display cover is connected to the main body via a dual-axis hinge mechanism to realize rotating or folding-over functions, so as to facilitate adjustment of the position of the display cover relative to the user.

A typical dual-axis hinge mechanism includes a rotatable bracket, a first rotatable assembly rotatably assembled on the rotatable bracket, and a second rotatable assembly pivotally assembled on the rotatable bracket. The display cover is rotatably connected to the main body via the first rotatable assembly to realize folding-over function, and the display cover is pivotally connected to the main body via the second rotatable assembly to realize rotating function. Generally, the second rotatable assembly includes a limiting member to restrict a rotation range of the display cover, thus preventing electric wires of the electronic device from damaging during the rotation process. However, a viewing angle of the display cover often need to be adjusted by moving the display cover together with the main body, due to the limited rotation range of the display cover, and thus causing an inconvenience to a user.

Therefore, there is room for improvement within the art.

BRIEF DESCRIPTION OF THE DRAWINGS

The components in the drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of the present disclosure. Moreover, in the drawings, like reference numerals designate corresponding parts throughout the several views, and all the views are schematic.

FIG. **1** is a schematic view of a notebook computer with a dual-axis hinge mechanism of one embodiment of the present disclosure.

FIG. **2** is an assembled view of the dual-axis hinge mechanism in FIG. **1**, the dual-axis hinge mechanism including a first rotatable assembly and a second rotatable assembly.

FIG. **3** is a partial, exploded, isometric view of the dual-axis hinge mechanism in FIG. **2**, showing the first rotatable assembly is exploded.

FIG. **4** is a partial, exploded, isometric view of the dual-axis hinge mechanism in FIG. **2**, showing the second rotatable assembly is exploded.

FIG. **5** is similar to FIG. **4**, but viewed from another direction.

FIGS. **6**, **8**, **10**, **12**, **14**, **16** are assembled, plan views of the second rotatable assembly in FIG. **2**, respectively showing the second rotatable assembly in different working states.

FIGS. **7**, **9**, **11**, **13**, **15**, **17** are assembled, isometric views of the second rotatable assembly respectively corresponding to the FIGS. **6**, **8**, **10**, **12**, **14**, **16**.

DETAILED DESCRIPTION

The present dual-axis hinge mechanism may be used in electronic devices such as notebook computers, PDAs, or mobile phones. Hereinafter, for the purposes of conveniently describing the dual-axis hinge mechanism of the present disclosure, an embodiment of the dual-axis hinge mechanism as used in a notebook computer is described and illustrated.

Referring to FIG. **1**, a notebook computer **200** with a dual-axis hinge mechanism **100** is shown. The notebook computer **200** includes a main body **201** and a display cover **203** pivotally connected to the main body **201** via the dual-axis hinge mechanism **100**.

Referring also to FIG. **2**, the dual-axis hinge mechanism **100** includes a rotatable bracket **10**, two first rotatable assemblies **20** rotatably assembled on opposite ends of the rotatable bracket **10**, and a second rotatable assembly **30** pivotally assembled to a middle portion of the rotatable bracket **10**. An axis A of each first rotatable assembly **20** perpendicularly intersects with an axis B of the second rotatable assembly **20**. The first rotatable assemblies **20** may be fixed to the display cover **203**, and the second rotatable assembly **30** may be fixed to the main body **201**. Thus, the display cover **203** can be rotated around the axis A relative to the main body **201** via the first rotatable assemblies **20**, and can also be rotated around the axis B relative to the main body **201** via the second rotatable assembly **30**.

Referring to FIG. **3**, the rotatable bracket **10** may be substantially U-shaped, and includes a flat sheet **11**, and two side sheets **12** extending substantially perpendicularly from opposite ends of the flat sheet **11**. The flat sheet **11** defines a mounting hole **111** in the middle portion. Each side sheet **12** defines an assembling hole **121** in an end portion. The mounting hole **111** and assembling holes **121** are non-circular holes.

Each first rotatable assembly **20** includes a rotating shaft **21**, a frictional piece **22**, a connecting member **23**, a rotating member **24**, a stationary member **25**, an elastic member **26**, a flat washer **27**, and a fastening member **28** sleeved on the rotating shaft **21**.

A cross-section of the rotating shaft **21** may be non-circular. The rotating shaft **21** includes a threaded portion **211** formed on a first end, a shaft head **212** formed on a second end, and a flange **213** formed around the rotating shaft **21** adjacent to the shaft head **212**.

The frictional piece **22** defines a substantially circular through hole **221** in a middle portion so that the frictional piece **22** is rotatably sleeved on the rotating shaft **21**. The frictional piece **22** defines a plurality of lubricating oil grooves **222** in a side surface.

The connecting member **23** may be substantially L-shaped, and includes a fixed plate **231**, and a connecting plate **232** extending substantially perpendicularly from an end of the fixed plate **231**. The fixed plated **231** defines a plurality of fixing holes **2311** used to fix the connecting member **23** on the display cover **203**. The connecting plate **232** defines a substantially circular shaft hole **2321** in an end portion, and two engaging grooves **2322** in the end portion adjacent to the circular shaft hole **2321**.

The rotating member **24** defines a substantially circular through hole **241** in a middle portion so that the rotating member **24** is rotatably sleeved on the rotating shaft **21**. The rotating member **24** forms two engaging protrusions **242** in a first side surface to be engaged in the engaging grooves **2322** of the connecting member **23**. The rotating member **24** defines two positioning grooves (not shown) in a second side surface opposite to the first side surface.

The stationary member **25** defines a deformed through hole **251** in a middle portion so that the stationary member **25** is non-rotatably sleeved on the rotating shaft **21**. The stationary